

**Florida Department of Health
Onsite Nitrogen Reduction Strategies Study**

Contract CORCL

TASK B.8

**Operation, Maintenance and Repairs Report for
Passive Nitrogen Reduction System
B-HS1**

October, 2013

Task B of the Florida Onsite Nitrogen Reduction Strategies Study (FOSNRS) includes performing field experiments to critically evaluate the performance of nitrogen removal technologies that were identified in FOSNRS Task A.9 and pilot tested in PNRS II. To meet this objective, full scale treatment systems were installed at various residential sites in Florida, operated on septic tank effluent under actual onsite conditions, and monitored over an extended timeframe. This report documents the operation, maintenance, and repairs required for the passive nitrogen reduction system installed at a home site in Wakulla County, Florida (B-HS1). Design and construction details were presented previously in the Task B.6 document, and the field system monitoring reports were presented previously in the Task B.7 documents.

Overall the system did not require much maintenance. A Hazen and Sawyer technician visited the site on a monthly basis; however, no maintenance was required. There were several major issues related to the start-up of the system as outlined in Table 1 below. A description of the start-up issue, the entity that performed the repair, and the associated cost are included in Table 1. Table 2 is the summary log of repairs, maintenance actions, inspection results and system observations since start-up.

Table 1: B-HS1 Summary of start-up, maintenance, repairs and refinement actions

| Date | Start-up | Maintenance | Repair | Refinement | Time (hr) | Cost |
|----------|--|---|--|--|-----------|-------|
| 7/7/11 | ME adjusted flow splitter device, recirculation rate higher than target of 5:1. | | | | 1 | \$75 |
| | ME corrected control panel wiring. | | | | 1.5 | \$113 |
| 7/19/11 | ME corrected override float location. | | | | 1 | \$75 |
| | ME adjusted recirculation rate. | | | | | |
| 8/18/11 | ME installed Vericomm panel to replace previously installed panel. | | | | 2 | \$150 |
| 9/13/11 | ME detected malfunction of the floats due to pump vault. | | | | 1 | \$75 |
| 10/17/11 | ME removed pump vault and reset pump and floats within second chamber of the primary tank. | | | | 1.5 | \$113 |
| 10/26/11 | | HS detected leaks in Aerocell split recirculation device. | | | | \$0 |
| 12/9/11 | | | ME replaced Aerocell split recirculation device. | ME increased target recirculation rate to 10:1 to improve performance of nitrification unit. | 2 | \$150 |

ME = maintenance entity = Apalachee Backhoe and Septic

HS = Hazen and Sawyer (field technician)

HO = homeowner

DOH = county health department

Table 2: Repairs, maintenance actions, inspection results and system observations log

| Date | Description |
|----------|---|
| 6/10/11 | Start-up of system |
| 7/6/11 | Homeowner reported that over the weekend the alarm kept sounding. |
| 7/7/11 | Contractor made site visit. The flow splitter device was adjusted. Some of the recirculation tubes seemed to be too low. Recirculation rate higher than intended. The wiring was not done correctly at install. Contractor rewired panel. Noted that the Nitrex sampling port has water which indicates that the Nitrex tank is now full. |
| 7/19/11 | Override float still triggering alarm. Contractor raised override float up, because of the float error. Contractor read water meter and adjusted flow splitter again. Contractor also checked the pump rate which is reading low. Pump flow rate measured at 12.5 gallons per minute. |
| 8/18/11 | Vericomm system panel installed to replace existing control panel. Drainfield observation ports installed. |
| 9/13/11 | FDOH collected samples. Contractor checked system and detected that a malfunction of the dosing floats for the pump causes a lack of dosing to the Aerocell unit. |
| 9/20/11 | Contractor checked system. |
| 10/17/11 | New sampling port for Nitrex sample installed by contractor. A tee was placed in the outlet pipe, so that a sample is taken directly from the effluent pipe. The pump vault was causing the floats to get stuck. Contractor removed pump vault within the second chamber of the primary tank. |
| 10/26/11 | Monitoring sample event No.1. Leaks apparent on Aerocell split recirculation device. Water level within the split recirc device approximately 1-inch below return tubes. Sand was noted in the return pipe leading into the pump chamber. |
| 11/30/11 | Contractor checked system. |
| 12/9/11 | Replacement of splitter recirculation device by vendor. |
| 12/23/11 | Vendor checked system. |
| 1/25/12 | Monitoring sample event No.2. Drainfield observation port #3 had ponded water ~0.25 inch in height. All other ports dry. |
| 1/30/12 | Recorded flows to verify recycle ratio. Drainfield observation port #3 had ponded water ~0.25 inch in height. All other ports dry. |
| 2/24/12 | Site visit. Drainfield observation port #3 had ponded water ~0.25 inch in height. All other ports dry. |
| 3/27/12 | Monitoring sample event No.3. Drainfield observation port #3 had ponded water ~0.125 inch in height. All other ports dry. |
| 4/20/12 | Site visit. Drainfield observation port #3 had ponded water ~0.5 inch in height. All other ports dry. |
| 5/24/12 | Monitoring sample event No.4. Drainfield observation port #3 had ponded water ~0.125 inch in height. All other ports dry. |
| 6/22/12 | Site visit. Drainfield observation port #3 had ponding of ~ 0.25 inch to 0.5 inch in height (uneven bottom) water across entire field of vision. All other ports dry. |
| 7/26/12 | Site visit. Discussed with homeowner his concerns about the system. Sampling called off due to rain from Tropical Depression Debby. |

7/30/12 Site visit. Heavy, intermittent rain, cancelled sampling again.

8/6/12 Monitoring sample event No.5.
 Drainfield observation port #3 had ponded water ~0.125 inch in height. All other ports dry.
 Ground saturated from recent heavy rains.

8/30/12 Monthly Monitoring. System appears to be in good working order, no issues
 Drainfield observation port #2 had ponded water ~3/8" inch water across entire field of vision.
 Port #3 had ponded water ~1/8" in a puddle about 1/2 field of view. Ports #1 and #4 were dry.

9/26/12 Monitoring sample event No.6.
 All drainfield observation ports were dry

10/26/12 Monthly Monitoring. System appears to be in good working order, no issues
 All drainfield observation ports were dry

11/28/12 Monitoring sample event No.7
 Drainfield observation port #2 had ponded water ~1/4" inch water across entire field of vision.
 Port #3 had ponded water less than 1/8" . Ports #1 and #4 were dry.
 Nitrex sample tube was blocked prior to sampling. The blockage was cleared using a stiff wire.
 Wood chips appeared a darker brown.

12/27/12 Monthly Monitoring. System appears to be in good working order, no issues
 All drainfield observation ports were dry.

1/24/13 Monitoring sample event No.8
 All drainfield observation ports were dry. Pressure gauge in Aerocell was observed
 at 2 psi during operation. Originally set at 7 psi